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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

MEMORANDUM

DATE: January 13, 1998

SUBJECT: Final Comments on Baseline Risk Assessment, American Chemical Service NPL Site, Griffith, Indiana

FROM: Pat Van Leeuwen
Toxicologist
Superfund

TO: Sheri Biachin
Remedial Project Manager

I have reviewed the revised Draft risk assessment submitted by ENVIRON, dated October 1997, which is based on the old database. I expect that this assessment will be updated once the new sampling results are available, and it is not certain what purpose this draft serves. I do not recommend that it be revised.

I find the October 1997 draft risk assessment to be very unsatisfactory. Because it is so fraught with errors, all of which could not possibly be documented here, I suggest that it be discarded. I find this effort very discouraging. EPA has held a number of meeting with the contractors, one of which included an inspection of the site, in order to insure that the new risk assessment would be acceptable to EPA. It is disturbing to see that the many discussions with ENVIRON over receptor populations, scenarios and exposure parameters, which EPA initiated to insure agreement on these issues, appear to have been completely ignored in this assessment. The time spent by EPA in this effort seems to have complete waste.

Some scenarios in this assessment , the construction scenario for example, are completely omitted in the assessment, although there was total agreement that future construction and Site development is a realistic expectation. Other scenarios are discussed as though they are not relevant, based on current Site conditions, although these same scenarios are also meant to apply to all future use

of the Site.

We had requested that ENVIRON submit a matrix of parameter inputs for EPA review prior to the preparation of any risk assessment. This was not done. Contaminant concentration values (means, UCLs on means, are not reported, nor are the values used in the risk assessment. Hot spot areas appear to have been eliminated by averaging and groundwater inputs appear to be based on averaging across the aquifer. Guidance documents were not used in the derivation of exposure parameter values and methodology, and often references, are not provided for derived values. In some cases, standard risk assessment values are simply changed, with no explanation or site-specific data.

Thus this document does not appear to be a good-faith effort to redo the risk assessment. My specific comments follow.

Section 2.1 Data Evaluation

* Page 2-3, Infrequently Detected Contaminants: Contaminants found in 5% or fewer samples are not to be automatically excluded. This decision requires the agreement of the site project manager, and is dependent on the contaminant toxicity, concentration and location. The presence of "hot spots" should always be evaluated before eliminating or averaging contaminants across a site area.

A list of contaminants not considered in the risk assessment and the reason for eliminating the contaminant should always be reported in the risk assessment. EPA did not see this information in the Site assessment.

Section 2.2 and Tables 2.1/2.2/2.3/2,4 Summary of Constituents

* Minimum/Maximum Detection Limits: It was not clear why the minimum and maximum detection limits for non-detects are reported, and how these values were used in the determination of the mean and 95th UCL of the mean contaminant concentrations. It would appear that the contaminant data for the non-detects was not useful when the detection limits were so high, yet I did not see any discussion which indicated problems with the calculations. The data used in this assessment should be clearly identified.

It is not clear whether special techniques were used to collect soil samples for VOC analysis, so that the volatile contaminants were not lost in the process. Some of the VOC levels in subsurface soil are extremely low, even though this is a predominantly VOC site. The sampling methods, e.g., were VOC samples collected from open pits or using closed boring, need to be further evaluated and reported. It is not clear what is reported in these Tables, or how the data was used.

* Site Contaminant Lists: The lists of the Site contaminants showing the mean concentrations, the 95th UCLs on the means, and the values used in the risk assessment for each contaminant in each area are not included in the assessment. This data is essential to the risk assessment.

* Eliminated Contaminants: The lists of contaminants which were eliminated from the assessment, along with the reason for the elimination, are not included in the assessment. This data should be included in the report.

Section 3.2.1 Area 1 Pathways:

* Page 3-7, para 2.: The assessment states that the future use assessment assumes that surface soil may consist of a mixture of surface and subsurface soils. My notes from August 28 1997 and September 2, 1997, as well as the letter to Joe Adams dated October 1, 1997, clearly indicate that we had mutually agreed that subsurface soil concentrations will be used as a bounding estimate for the future routine worker surface soil exposure in this area, as the use of ANY mixture of surface and subsurface soil is pure conjecture. This appears not to have been done in this assessment. The Area 1 assessment should be corrected to reflect our prior discussion on this issue.

* Page 3-8, 4th para.: On the teleconference of September 2, 1997, we agreed that the production wells had not as yet been sealed, and that there was no justification in the risk assessment to support a deed restriction. My notes reflect that it was mutually agreed that the revised risk assessment would include both ingestion and dermal exposure to the groundwater from onsite wells for both the current and future land use scenarios. These groundwater pathways were not included in this assessment.

Section 3.2.2 Area 2 Pathways:

* Removal Action for Area 2: Evaluation of data for this area indicates that contaminant levels are high enough to constitute harmful exposure. Our joint discussions concluded that concentration ranges of soil contaminants would drive the use of maximum values due to the presence of pure product in the area of leaking drums. Such elevated contaminant levels mandate a removal action, not a consideration of remedial alternatives. This area should be reevaluated after a removal action, using post-removal data. Conducting a routine risk assessment in the manner specified here does not make sense.

* Page 3-9, 1st para: Any future use of area 2 would require a construction scenario? The expectation by EPA is that the future land use "excavation" worker scenario will be different from the "10 day" maintenance scenario evaluated for area 1.. The construction scenario is missing..

* Page 3-9, 4th para.: The risk assessment indicates that the use of a mixture of surface and subsurface soils constitutes a bounding estimate for the future routine worker. An equal mixture could never be a bounding estimate; my notes indicate that there was mutual agreement to use the subsurface soil concentration as the bounding estimate. Area 2 soil exposure calculations should be carried out using the subsurface concentrations; this calculation should be labeled the bounding estimate, given the uncertainty in any soil mixing assumption..

Section 3.2.3 Area 3 Pathways:

* Page 3-10, 4th para.: Again, a mixture of surface and subsurface soil cannot constitute a bounding estimate for future soil exposure in the routine worker and excavation worker scenarios. It was mutually agreed that subsurface soil concentrations provide the only reasonable bounding estimate. The assessment for this area should be corrected to reflect the exposure to the increased concentrations.

* Page 3-10, 5th para.: Again, the exposure during future construction activities is not evaluated. The text only describes a 10 maintenance excavation scenario (those exposure is erroneously averaged over 365 days). The evaluation for the future extended excavation worker (construction scenario) should be provided.

* Page 3-10, last para.: Air exposures from vapor and particulate emissions to off-site residents (Area 5 residents) should be carried into the Area 5 evaluation and coupled with any exposures from other pathways to this resident population, such as groundwater exposures.

Section 3.2.4 Area 4A Pathways:

* Page 3-11, 2nd para.: It is not clear whether the off-site residential exposure evaluated here is different from the exposure to residents in Area 5. They most certainly have different groundwater exposures, yet I do not see a separate risk evaluation for this area. They would appear to be a subset of the off-site residential. How the risks to residents nearest to Area 4A (this is the 5B residential Area on my map) compare to the risks to residents east of Areas 2 and 3 (this is residential area 5A on my map) should be discussed in the assessment. It is also not clear which well data was used in the residential assessments; this should be clearly explained.

Section 3.2.4 Area 4B Pathways:

* Page 3-12, 1st para.: As previously discussed, a mixture of surface and subsurface soils is not a bounding estimate.

* Surface Water: The migration of groundwater to surface water was observed in this area. Some data from surface samples taken in this area was provided to ENVIRON (was this the August 11, 1997 data that ENVIRON indicated was added to the database in their letter of October 28, 1997?). Exposure to surface water contaminants appears to be missing in this assessment.

Section 3.2.6 Area 5 Pathways:

* Page 3-13, 1st para.: The usual and reasonable use of upper aquifer groundwater is incidental ingestion and dermal contact from swimming/wading pools filled using non-municipal water. The receptor population of concern is the child. This scenario should be evaluated in conjunction with the use of this aquifer as a more reasonable scenario that the one supplied in this assessment (watering of the lawn by a toddler).

Section 3.3.1 Exposure Concentrations in Soil

* Page 3-14, 1st - 3rd para.: The discussion should indicate how "hot spots" are evaluated. Data from hot spot areas may not be combined with contaminant data from non-hot spot areas in the calculation of the mean or 95% UCL of the mean values. Biased sampling may provide data for exposure to hot spots, while random sampling may provide data for exposure to other locations within

the site area. Site exposure should not be considered to be random if the scenario allows for focused exposure to some likely frequented site feature. Examples would include a path or trail, a pond, a work station, or any other feature that a receptor would be likely to visit more often than other portions of the site area.

Section 3.3.2 Exposure Concentrations in Ground Water

* Page 3-14, discussion.: The well data which is used in the Areas 1, 4B, 5A and 5B assessments should be clearly identified. A review of data in Table 2-3 indicates that the contaminant concentration are quite variable and different by orders of magnitude (examples include Area 1 benzene levels range from 0.001 to 100 mg/L and Area 5, A or B?, lead levels which include the value of 41.7 ug/L). Obviously, these are not homogeneous aquifers, and consideration of exposure to contaminant concentrations which are more representative of the actual receptor exposure should be included in the assessment. Region 5 has guidance which prohibits averaging contaminant concentrations from different areas of an aquifer.

Additionally, It is not clear how ENVIRON knows that the use of the maximum detected concentration is overly conservative. EPA considers that the maximum concentration is not likely to be known. If sampling can be shown to have detected the maximum contaminant concentrations in the aquifers in the areas being evaluated, this should be explained in the risk assessment. It is also not clear how ENVIRON knows that most future excavation activities "are likely to occur at some distance from the location of the maximum concentration". This should also be explained in the assessment.

Section 3.3.4 Exposure Concentrations in Air

* Page 3-16, 2nd para.: Where site-specific data is used in place of defaults, the data should be presented and the strength of the data for use in this manner should be discussed.

* Page 3-16, 3rd para.: It is not clear what ground water concentrations will be used in the modeling exercise. The use of the highest detected contaminant concentrations (which have not been shown to be the highest concentrations in the aquifer) would constitute an appropriate bounding value, and should be included in the evaluation.

* Page 3-16, last para.: Given the great uncertainty over the use and activities which may occur at the different areas of the Site, appropriate bounding estimates for the vapor emissions and particulate emission modeling would be provided by assuming that the subsurface soil concentration becomes the surface soil concentration, and soils are disturbed (both of which probably occur during excavation and during construction).

EPA has some concerns over the values which ENVIRON may have used in this assessment after reviewing the lead air values derived by such modeling; these values are 2 orders of magnitude lower than any air lead levels measured during national ambient air monitoring, and would appear to be unsupportable values. Site-specific dat a included in air modeling and the modeling results should be included in the assessment for review. The details of the air modeling are not in Appendix C, as reported in the text.

* Vinyl chloride: EPA has requested that migration of vinyl chloride in soil gas be considered

at this site because of the large number of chlorinated hydrocarbons present, and has given ENVIRON information to assist in this evaluation. Assessment of vinyl chloride is not discussed here, and it is not clear if such an assessment was performed.

Section 3.4.3 On-site Trespasser Intakes:

* Surface Water contact: Standing water (actually, contaminated standing water) was detected in Area 4B. As per our discussions, it was mutually agreed that contact of a trespasser with Surface Water would be evaluated for Area 4B. This exposure pathway should be included in the assessment.

Section 3.4.4 Off-site Resident Intakes:

* Vinyl chloride: Migration of vinyl chloride in soil gas should be evaluated for Areas 5A and 5B, and in any other Area in which methane or other VOC migration has been detected EPA has previously provided ENVIRON with some methodology and guidelines for this evaluation..

Section 3.4.5.1 Contact Rates/ Routine Industrial Worker:

* Overall: The scenario description does not explain whether this is the present land use (ACS) worker or the future on-site industrial worker. Perhaps the scenario should be relabeled, as the assumptions are not consistent with a typical routine industrial worker scenario. The manner in which these scenarios could differ should be discussed, and the differences in risk for a future industrial worker presented.

* Page 3-21, First Bullet, Incidental Ingestion: The incidental ingestion rates reported here are inconsistent with the EPA values of 100 mg/day for the RME exposure and 50 mg/day for the CT exposure for a non-contact intensive (indoor) worker. (Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure, November 1993.) EPA has noticed that ENVIRON has not used the 1993 reference consistently throughout the Site assessment.

In addition, EPA considers that a value of 100 mg/day is more typical (read as an average or CT value) for an outdoor worker, such as the receptor described in this scenario. EPA suggests that a higher ingestion rate would apply to the time spent outdoors in the RME scenario. For these reasons, the values used by ENVIRON in the routine worker scenario are unacceptable to EPA for the time spent outdoors by this receptor.

* Page 3-21, Second Bullet, Dermal Contact: The Dermal Exposure Assessment: Principles and Applications, EPA/600/8-9/011B, January 1992 guidance is not to be replaced with the data from the August 1996 Draft Exposure Factors Handbook. The EPA guidance still requires that the soil-to-skin adherence factors of 1.0 and 0.2 mg/cm2-event be used for the RME and CT scenarios, respectively. While the dermal guidance is currently under review, EPA has not yet issued new guidance for the dermal pathway.

The methodology described in Volume 1, Chapter 6, of the Draft Exposure Factors Handbook (August 1996) may be used to derive a bounding estimate in the uncertainty section. Because this methodology considers exposure of the whole body surface to dust exposure, rather than the use of the

input value of 5800 cm2 (or 25% of the body area) recommended in the 1992 Dermal Guidance, it is not certain whether this will result in a lower or an upper bounding value. It will depend on the scenario. In any case, the derivization of the values to be used for the median (CT) and upper bound (RME) dermal soil loading rates needs to be clearly shown in the risk assessment. This includes the body surface area used, the % of body surface due to each body part, how the adherence values for each body area was developed and the adsorption values for each body area. Simply listing a value, such as 227 mg/day for the RME routine worker, is neither supportable nor good science. It should be noted that this RME value is considerably lower than the traditional CT input value (5000 cm2 x 0.2 mg/cm2/day = 1000 mg/day), so some explanation for this low value is clearly expected.

The reference to the Kissel et al. (1996) study used in the dermal calculation is missing. EPA does not use the 95% UCL of the mean for the RME intake parameter, but rather the 90th or 95th percentile value on the distribution. This is different than the 95% UCL on the mean for the adherence factor for each body part. ENVIRON should more clearly explain what is meant by the "95% UCL value" in this case.

For the CT calculations, ENVIRON should explain in the assessment how the geometric mean value was obtained from the Kissel data, and why a geometric mean rather than an arithmetic mean is calculated for this parameter, given the sparse data available.. Actually, it is not clear how ENVIRON derived any of these values as this is not discussed in the assessment.

ENVIRON needs to be aware that EPA is working with Dr. Kissel to derive values that may be useful for risk assessment. Kissel has indicated that the grounds keepers studied wore gloves, and that this data set should not be used for risk assessment purposes, so a different data set may need to be identified if this calculation is included in the assessment. This set of problems with the dermal risk calculations further supports the need for ENVIRON to provide parameter inputs to EPA for review before proceeding with such calculations.

* Page 3-22, Bullet, Ingestion of Groundwater: The statement in the second sentence "Such activities using water from an on-site well are not known to take place st the Site, but could hypothetically occur" suggests that this scenario is not meant to apply to the Current on-site workers. . Who is the receptor in this scenario? The text indicates that the scenario applies to all future land uses, as well as the restricted land use envisioned by ENVIRON. The text in the assessment should be consistent with the intended receptor population.

I do not think that ENVIRON can predict how this land will be used in fifty or one hundred years. The assessment should attempt to be more inclusive or only the more conservative scenario should be evaluated. The reason for the current scenario is to determine if a removal action is needed or an interim restriction on site activities, such as on-site excavations, should be instituted. Such statements which confuse the assessment should be eliminated.

* Page 3-23, First para.: This paragraph is both redundant and inconsistent with the explanation for the ground water ingestion rate presented in the previous paragraph (page 3-22). This paragraph should be omitted.

* Page 3-23, Bullet, Groundwater Dermal Contact: The EPA RME default skin surface area for outdoor contact is 5800 cm2 or 25% of the body surface area , with a value of 5000 cm2 recommended for the CT soil contact scenario (Dermal Guidance, 1992). The values of 3100 cm2 and 2000 cm2, quoted in this assessment are not consistent with the recommendations in Table 8-6 of the Guidance, although this document is quoted as the reference for these values. It is also not consistent with the methodology presented in the Exposure Factors Handbook. The values in Table 8-6 of the 1992

Dermal Guidance (58000 cm2 and 5000 cm2) would appear to be more appropriate in this scenario assessment., unless some sound rationale can be offered for a reduced values. No explanation is offered in this assessment.

* Page 3-23, last para.: The Supplemental Guidance, Dermal Risk Assessment, dated August 18, 1992, Appendix A, contains a list of chemicals for which dermal exposure in water should be considered. The permeability coefficients (Kp's) for each chemical in the list are included. These values should be used in the Site risk assessment for consistency with other Region 5 assessments. This document was listed in the reference list.

Section 3.4.5.2 Exposure Frequency/Routine Worker

* Page 3-24, First para.: The draft document "Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure", 1993, allows for a CT occupational exposure of 219 days, based on an average for all full and part-time workers. If part-time workers are not expected at the Site, the value of 250 days/year is a more reasonable value. These are values typically used in Region 5 risk assessments, and should be used in this assessment for consistency.

* Page 3-25, FI term: The derivization of the FI (fraction ingested) ratio has neglected to include two critical elements: first, that the amount of time spent outdoors typically accounts for a higher portion (55% for children) of the daily soil ingestion (see input values in the assessment of lead ingestion in the IEUBK Model), and second, that ingestion of soil during the remaining time (is it presumed that the maintenance worker spends the balance of the time indoors?) occurs at a similar concentration. Because the available data is specific to children, EPA does not usually segment the adult soil ingestion in the manner presented by ENVIRON, but assumes that the default soil ingestion reflects ingestion of both outdoor soil dust and indoor soil-derived dust, and that the contaminant concentrations are similar. When it is clear that the ingestion rate may be higher because the worker scenario includes both outdoor and indoor exposures, it is appropriate to use an outdoor exposure rate for portion of the time and the indoor worker exposure rate (100 mg/day) for the portion of time spent indoors.

It is recognized that this method of assessment may be unconservative for contaminants which degrade in UV light (as no degradation takes place indoors and measured indoor contaminant levels are usually higher). In any case, the overall soil ingestion contact frequency is not reduced to 188 days or 45 days/year, as suggested here, and the entire worker time needs to be included.

* Page 3-26, Second Bullet, Soil Contact Frequency: A reasonable assumption here would be that the worker contacts indoor soil-derived dust for the balance of the duration. This exposure appears to be missing in the assessment, and should be included to be consistent with the ingestion scenario.

* Page 3-26, Second Bullet, Inhalation: The inhalation rate used in this assessment is not specified here or in Tables 3-5 or 3-6. EPA suggests the use of activity-specific inhalation rates over the 8 hour/day exposure duration as a more reasonable approach than prorating the residential inhalation rate.

Section 3.4.5.3 Exposure Duration/Routine Worker:

The EPA 1993 Default Exposure Guidance document lists 20 and 5 years as the reasonable input values. ENVIRON should submit a copy of the new USDOL data to EPA to support the values suggested here.

Section 3.4.5.5 Averaging Time:

ENVIRON properly recognizes that the noncarcinogenic averaging time should reflect the exposure duration in days. While the averaging time will probably be greater than the actual exposure time because exposure only occurs 5 out of 7 days a week, the exposure for noncarcinogens should not be averaged over time periods when no exposure occurs. An example would be the 40 day groundwater exposure which only occurs in summer months (perhaps 16-18 weeks). The values shown in Tables 3-5 and 3-6 do not represent reasonable averaging times for short-term exposures.

Section 3..4..6.1 Contact Rates/Excavation Workers:

* Overall: The purpose for this scenario is not completely clear. If the excavation work is done by present Site workers or the future industrial routine/maintenance worker, it should be included as part of that scenario. If this scenario is meant to reflect the more conservative construction scenario, the values are not appropriate. Because both the present Site use and any future industrial use would require some construction activities, the risk associated with a longer duration, more contact intensive exposure should be evaluated. EPA had expected that the "excavation" scenario was ENVIRONS term for the construction scenario, and is surprised to see that this critical scenario is missing in the assessment. The construction scenario should be included, and the excavation scenario put into perspective.

* Page 3-28, First Bullet, Soil Ingestion Rate: There are a number of datasets in the literature. While the Kissel data suggest a lower value, it is not certain if the 8 irrigation workers in this dataset were wearing gloves (as the grounds keepers were). The data on adult ingestion collected by Calabrese would suggest that the intake can be quite variable, and a much higher value could be supported. In addition, we have not seen any tracer data from Kissel et al., and do not believe that his data can be extrapolated to derive ingestion rates. EPA requests that ENVIRON remove such biased statements from the Site assessment.

* Page 3-28, Second Bullet, Dermal Contact Rate: Again, EPA finds the values derived using the Kissel data unacceptable. The Kissel (1996) reference is not listed. EPA is still trying to identify upper-bound values suitable for use in deriving the soil adherence values for the RME exposure. The use of the mean adherence values (which are more similar to average or CT intake values) would not be appropriate for the RME exposure rate. Also, the irrigation worker soil adherence was measured after only 3 hours, and the workers in the Site scenario are assumed to work for 8 hours. Kissel does have some end of day means and standard deviations for construction workers (a better match for the ACS construction workers); the upper value appears to be 1.49 (or 1 ½ times the EPA value for the RME).

The mean would be a more appropriate value for the CT than the geometric mean value used by ENVIRON, given the sparse data.

ENVIRON neglects to include that the new methodology described, which uses a skin adherence factor, is recommended when whole body surface area contact is to be considered, a match matching data

set can be identified and supported and that the confidence in this estimate is low. As noted previously, EPA has not issued new guidance for the Dermal Contact pathway, and it is expected that the 1992 Dermal Guidance recommendations will be used in the assessment until new guidance is available. Other data can be used to derive bounding estimates.

* Page 3-29, second para.: Where is Section 3.4.1.1? The reference here and in the next section appears to be incorrect.

* Page 3-29, Dermal Contact with Groundwater: As in the routine worker scenario, EPA finds the skin surface areas to be inconsistent with the Default Exposure guidance (1993) values. No justification for the values given (3100 cm2 and 2000 cm2 for the RME and CT, respectively) are found in the assessment.

Chemical-specific permeability factors from the Supplemental Derma Guidance should be used where available.

Section 3.4.6.2 Exposure Frequency/Excavation Worker:

* Page 3-30, First Bullet, Frequency of Ingestion: It is not clear how the very limited exposure to the excavation worker (10 days) can be used to determine if there is a long-term risk to anyone. This is an acute scenario. This scenario needs to be expanded under the future land use to include a construction scenario. (Any future use will involve some construction activities). A reasonable scenario, which encompass at least 9 months of construction activities, should be developed. The averaging time should be consistent with the time frame of the construction activities for non-carcinogens.

* Page 333-30, Second Bullet, Frequency of Dermal Contact: See above comment.

* Page 3-30, Third Bullet, Frequency of Inhalation: See above comment. In addition, EPA recommends that activity-specific inhalation rates be used to derive appropriate inhalation rates for the 8 hr exposure day, rather than a proration of the residential inhalation rate.

* Page 3-30, Fourth Bullet, Frequency of Contact with Groundwater: See above comment.

Section 3.4.6.2 Exposure Duration/Excavation Worker:

* First and second bullets: The ten day high contact exposure over 20 years more correctly constitutes a part of the routine worker/maintenance worker exposure scenario. The chronic exposure to a construction worker should be evaluated using exposure period of more typical duration, usually 9 months.. EPA expects that a construction scenario of such reasonable duration be evaluated at all commercial/industrial sites. The limited excavation scenario described here does not satisfy the needs of the assessment.

Section 3.4.7.1 Contact Rates/Trespasser

* Page 3-31, Incidental Ingestion: The ingestion rate presented here, 10 mg day, is not well supported and is not acceptable to EPA. While a trespasser aged 9-18 years may be awake for 16 hours, it is unlikely that he spends more than 3-4 hours/day outdoors as an upper-bound. ENVIRON has suggested that a typical time spent outdoors by this receptor population is 1.5 hours. Because the outdoor exposure is a "dirtier" exposure, most of the soil ingestion occurs during this outdoor time.

Region 5 considers a reasonable (standard) RME trespass scenario to consist of 54 days a year at 4 hours a day, while the CT exposure scenario provides for a reduced number of days at 2 hours/day. Therefore, it is reasonable to believe that between 50% and 100% of the daily adult ingestion rate occurs during the trespass exposure. These inputs give appropriate bounding estimates for the trespass scenario, and should be used in this assessment.

* Page 3-32, Dermal Contact/Trespass: As stated previously, Kissel has indicated that the grounds keepers wore gloves, and that this data should not be used to derive estimates for other exposure scenarios. It is not expected that the trespassers will wear gloves. It is not clear why ENVIRON finds this data acceptable. EPA recommends use of the values for the soil adherence rate (1.0 mg/cm2 for the RME and 0.2 mg/cm2 for the CT exposure) in the 1992 Dermal Guidance. This guidance should be used to derive an exposures for this Site in areas 1,2 , 3 and 4B.

In addition, EPA does not know where the 95% UCL adherence factors used by ENVIRON come from or why a UCL mean value rather than a 90th or 95th percentile of the distribution should be used.

It is not clear why the geometric rather than the arithmetic mean used for this parameter in the CT calculation. Appropriate Kissel data may provide a basis for a bounding estimate, but the confidence in that data at present is very low. See also above comments on this issue.

* Page 3-33, First Bullet, Ingestion Rate for Surface Water: It is not clear where the trespasser exposure time of 1.5 hours/day comes from, as the source is not clearly identified. Region 5 uses 4 hours/day for a standard RME trespass exposure and 2 hours/day for the CT scenario. ENVIRON uses the same exposure time for both the RME and the CT scenarios, which does not make much sense.

* Page 3-33, Dermal contact with Surface Water: As previously stated, the chemical-specific permeability coefficients listed in Appendix A of the Supplemental Dermal Guidance should be used when available.

Section 3..4.7.2 Exposure Frequency/Trespasser:

* First Bullet, Frequency of Incidental Ingestion: The 52 days/year is similar to the standard Region 5 trespass scenario of 54 days/year, with the major difference that EPA does not expect that children will trespass on the site in winter. The EPA scenario assumes 1 day/week in April, May, September and October and 3 days/week in summer months of June, July and August as a basis for the 54 day exposure. This exposure scenario is more probable, does not require the derivization of the more speculative FI term, and is recommended for trespass scenarios in Region 5. The non-carcinogenic risks from these exposures should be averaged over 7 months.

* Same as above: The statements about regular trespassing on-site drawing the attention of

site personnel is confusing. EPA did not the Site to be secured, and assumes that the trespassers can easily enter the 4A and 4B areas without drawing the attention of on-site personnel. Future trespass may be totally unrestricted. If the trespass scenario does not allow for on-site trespass under these conditions, then this scenario needs to be expanded.

* Page 3-34, Second Bullet, Frequency of Dermal Contact: See comment on the frequency of the incidental ingestion above.

* Page 3-34, Third Bullet, Frequency of Inhalation: See above comments on exposure frequency for standard trespass scenario.

* Page 3-34, First para.: EPA notes that ENVIRON simply prorated the inhalation rate, without considering the receptor activity. EPA notes that extreme detail is provided to support factors which reduce the exposure, but when the exposure may be increased by such an effort, ballpark values are used. It is reasonable to assume that the inhalation rate would be greater for someone walking, hiking or performing some activity during the trespass than during the sleeping hours. Inhalation rates are available for different activity patterns. EPA suggests that more appropriate inhalation rates be used for the trespasser.

* Page 3-35, Frequency of ingestion of Surface Water: Exposure frequency for this pathway should be adjusted as described above.

* Page 3-35, Frequency of Contact with Surface Water: See above comment.

Section 3.4.7.3 Exposure Duration/Trespasser:

Again, it is not clear from the text who the receptor is in this exposure scenario. It appears that ENVIRON is suggesting that trespassing is always observed and stopped in areas 4A and 4B at present, and that trespassing on-site will always be stopped in the future. These statements are either inappropriate for the scenarios under consideration, or the trespass scenario needs to be expanded.

Section 3.4.8.1 Contact Rates/Residential:

* Page 3-36, Second Bullet, Dermal Contact with Sediments: As previously discussed, EPA does not know why the 95% UCL adherence factor for the reed gatherers was used or how this value was derived.. ENVIRON should submit this data for EPA review. And again, how was the geometric mean adherence factor determined, and why was a geometric mean used instead of an arithmetic mean? The dermal scenario requires more documentation. See also the above comments on this issue.

* Page 3-37, Incidental Ingestion of Groundwater: It is not clear how the child's exposure is going to be assessed. It is typical to assume that this water is used to fill a swimming or wading pool. Incidental ingestion is likely in a swimming activity, and guidelines are available in the Dermal guidance for the number of days and hours spent swimming. New EPA guidance specifies that the child exposure must be evaluated in the assessment, and this is a reasonable scenario.

* Page 3-38, Dermal Contact with Groundwater: A child under the age of 6 watering the lawn for an hour is a very unlikely scenario. EPA suggests that the swimming pool/wading pool exposure be evaluated as suggested above. In addition, dermal absorption of VOCs during the lawn-watering exposure is not likely due to volatilization.

* Page 3-38, Dermal Contact While Showering: The child 12 minute showering scenario is not supported by most toxicologists. Small children usually take baths; these are usually of longer duration (on the order of 20-30 minutes). The child bathing scenario should replace the child showering scenario.

* Same as above: Please see the prior comments on the derivization of permeability coefficients.

Section 3.4.8.2 Exposure Frequency/Residential:

* Page 3-40, Frequency of Inhalation of Vapors: What residential excavation activities are referred to here?

* Page 3-41, Frequency of Ingestion of Groundwater: A typical swimming scenario should be used for the child exposure scenario. See above comments on this issue.

* Page 3-41, Frequency of Dermal Contact with Groundwater:: See above comments on appropriate outdoor groundwater exposure scenarios for children under the age of 6.

Section 3.4.8.5 Averaging Times/Residential:

* In general: When short-term exposures are evaluated, the averaging time is more correctly related to the actual time periods times the number of times the exposure occurs, than to an averaging time that uses a 365 days/year when the exposure occurs over a shorter number of days or weeks. As previously stated, this averaging time correction needs to be applied throughout the risk assessment.

Section 4.1 USEPA Toxicity Values:

* Second para., 3rd sentence: It is not clear what is meant by "actual" risk here. The true or actual risk would depend on the combination of input values used in the calculation. And while the range of probabilities would theoretically include a value as low as zero, the likelihood of the average or upper-bound risks being as extreme as zero is unlikely!

Section 4.2 Constituents Without EPA Toxicity Values:

* Chromium (Total): The text indicates that the toxicity values for trivalent chromium are used for total chromium in this assessment. Actually, EPA recommends the use of the 1:7 mixture ratio for Cr (VI) and CR (III), as indicated in IRIS, to determine the fraction of chromium VI in the total and

the application of the chromium VI slope factor to this portion of the total chromium. The methodology employed by ENVIRON is likely to underestimate the risk from this contaminant. Of course, speciation data eliminates the need for such a generalized approach.

Section 4.2.2.1 Child Lead Exposures:

* Page 4-3, last sentence: "Current and future exposures" should be "Current and future land use exposures".

Section 4..2.2.2 Adult Lead Exposures

* Equations 4, 5 and 6, pp 4-4 to 4-6: While the equations outlined by ENVIRON are not incorrect, they do not allow a meaningful estimation of risk in the population of concern, the fetus of a woman of child-bearing age. If the risk calculation is to be done, the equations from the Adult Interim Methodology should be rearranged in a manner to allow calculation of the probability that the fetal blood lead level will exceed the level of concern (10 ug/dL). This endpoint is consistent with the endpoint in the IEUBK Model. This calculation is easily done using the equations in the Methodology. More detailed instructions are included here to aid ENVIRON in this calculation.

The endpoint derived by ENVIRON - the 95th percentile blood lead level for the fetal population - is not readily compared to any meaningful endpoint, and thus should not be used in the assessment.

* Page 4-6, 2nd para., last sentence: It is unlikely that anyone can say that women of child-bearing age will never be employed in a facility on the ACS site. Because no industry can discriminate in hiring based on sex, female workers remain a real and likely possibility at the ACS site, and even more likely at a future development on the property. For this reason, this statement ~~appears to present a rather feeble and inane argument,~~ and the sentence should be deleted.

* Page 4-6, 3rd para.: The trespasser exposure frequency is discussed in Section 3.4.7.2, not 3.4.3.2 as stated. This trespass scenario and the reason for not including lead exposure estimates for the trespass scenario are inconsistent with Region 5 recommendations. Region 5 considers the adolescent trespass scenario to be as follows: 1 day/week in April, May, Sept. and Oct. (or 18 days) plus 3 days/week in June, July and Aug. (or 36 days) for a total of 54 days which occur over a period of 7 months. In addition, the RME exposure is considered to be 4 hours/day, while the CT exposure is 2 hours/day. Under these conditions, lead exposure can, and usually is, evaluated for the trespass exposure. The Adult Interim Methodology is reasonable for the Region 5 scenario.

*Same as above: The excavation worker exposure frequency is discussed in section 3.4.6.2, not 3.4.2.2 as stated. While EPA does not expect the Adult Interim Methodology to be used to evaluate such a scenario, a longer excavation scenario, as might occur during any construction activities at the site, should be evaluated using this methodology.

* Page 4-7, first bullet: EPA would caution ENVIRON against deriving separate baseline blood lead values either for a combination of white female and male workers in the Midwest or from data on female workers of child-bearing age, from the NHANES III data. Because of the non-representative

sampling and small numbers for some sub-group, Brody used a very sophisticated weighing scheme in her analysis to derive estimates for the population. While the value derived by ENVIRON for the baseline blood level input (1.75 ug/dL versus the default value of 1.7 ug/dL)) are not unreasonable, extrapolation to other subsets might lead to grossly erroneous results. All such extrapolations are discouraged by EPA. Input value should only be adjusted when there is site-specific data to support an alternate value.

* Page 4-7, last bullet: EPA interprets this to mean that an exposure frequency of 170 days/year is assumed for outdoor exposure to routine workers and the balance of the 237 days is assumed to occur as indoor exposure. (Note that the 250 days/year is based on actual US Department of Labor data for the full time worker population, so it is not clear why this adjustment is necessary.)

Given the lack of additional data, it should also be assumed that the outdoor soil lead concentration and the indoor dust lead concentration are equal (the usual assumption in an industrial setting). The value for the soil to dust transfer coefficient of 0.70 quoted here actually applies to the residential scenario, not the industrial scenario. Routine vacuuming is not expected to take place at the industrial site, and there is NO data to support a lower indoor lead concentration at this site. EPA does not accept the values derived by ENVIRON for this parameter .

* Page 4-9, Ingestion Rate: The EPA default ingestion rate of soil and indoor dust is 50 mg/day for the average worker in a non-contact intensive soil exposure scenario (no outdoor exposure). When outdoor exposure is expected, a reasonable average ingestion rate is 100 mg/day, except in more contact intensive activities such as digging, where an ingestion rate of 480 mg/day is more appropriate. EPA did not see any justification for adjusting the default ingestion rate for the routine worker at this site, and therefore, does not find the value of 25 mg/day acceptable. (Note that the EPA methodology uses the 1993 reference for the ingestion rate, while ENVIRON uses the 1991 document).

*Page 4-9, last bullet, GSD: A stated above, EPA does not support the recalculation of the GSD from the NHANES data. The value derived by ENVIRON of 1.87 is higher than the default value of 1.8 for a more homogeneous population, and reflects more variability in the worker population. (Note that Brody derived a value of 1.89 for the entire national white female worker population of child-bearing age). Such a value may be overly conservative for the Griffith, Indiana workforce.

Section 5.0 Risk Characterization

* Page 5-1, Last para.: The last sentence, which begins "According to USEPA..." and the sentence that follows on page 5-2 pertains to EPA guidance for remedy selection, not to risk management. The risk assessment is an unbiased evaluation of risk at the site. It is not appropriate to risk manage in the risk assessment; this statement should be moved to the remedy selection of the RI.

Section 5.2 Blood Lead Levels:

* Page 5-6, Section 5.2.1, Bullet: The air concentration of 0.0003 ug/m3 used here is suspect. This level is several orders of magnitude lower than measured ambient levels. If real data is not available for the Griffith area, the Model default concentrations or the State ambient air concentration should be used. The value is not reasonable, and thus not acceptable to EPA.

* Page 5-6, above: The modeled site air lead concentration several orders of magnitude below the usual ambient level raises concerns about the reasonableness and accuracy of off-site air concentrations used for other contaminants as well. The modeling results should be included in a table; these concentrations should be compared with normal ambient levels where data permit. Some air monitoring should be considered for this Site.

* Page 5-7, First Para.: The air lead concentration of 0.0004 ug/m3 is several orders of magnitude lower than the lowest ambient levels monitored nationally. See above comments on this issue.

* Page 5-7, Bullets: These statements would appear to refer to some sort of average drinking water lead concentrations. The data show that the aquifers are not homogeneous, and private well lead concentrations range to 41.7 ug/L, which is well above EPA's action level (15 ug/L). Other Area 5 wells show high concentrations as well. ENVIRON should indicate which wells were used in the Area 5A and Area 5B assessments. Region 5 has guidance which prohibits the averaging of contaminant concentrations across aquifers.

Section 5.2.2 Adult Blood Lead Levels:

* Sections 5.2.2.1 and 5.2.2.2: The calculations for adult exposure in these sections are incorrect, as previously discussed. See the prior comments on the use of the Adult Lead Methodology in this assessment. ENVIRON should work with EPA to correct these calculations.

Section 5.3 Uncertainty:

* General Comment: The site characterization should include discussions of conditions which could result in underestimation of risk as well as overestimation of risk. ENVIRON has not presented a very balanced or objective discussion of uncertainty in the Uncertainty Analysis Section. The following sections present some conditions under which may result in underestimations. These need top be included in these uncertainty sections.

Section 5.3.1 Uncertainty/Site Characterization:

* Underestimation due to hot spot exposure: The averaging of contaminant "hot spot" concentrations with contaminant concentrations from non-contaminated areas is statistical dilution, and causes underestimation of site contaminant levels. The exposure activity patterns of the receptor populations (under the present land use and the future land use) cannot be known. Biased exposures can and do occur because of non-random activity patterns, and these can result in exposure to hot spot areas.

* Underestimation due to incomplete sampling: While site sampling was focussed to identify the areas and extent of contamination, it cannot be known whether the maximum contaminant concentrations on the site have been detected. This is especially true when sampling was not conducted in a manner to eliminate such concerns. In cases where on-site contaminant levels may exceed the maximum detected concentrations, the risk will be estimated. The likelihood of such a problem at this

Site cannot be eliminated, given the sample collection methods.

* Underestimation due to toxic decay products: Site contaminants may decay to more toxic chemicals. This is particularly true of the type of chlorinated solvents found on this site.

Section 5.3.2 Tentatively Identified Compounds (TICs):

* Page 5-15, last para.: The effect of the TICs on the final risk estimate is not presented. The text indicates that they are not "significant"; what is significant is left to interpretation. The risk due to the TICs should be clearly shown. The presence of "600 unique contaminants" whose toxicity or interaction can only be guessed at, would seem to be verification of the gross contamination at the site and should raise the level of concern for any thinking person. I saw no comment that suggested that the presence of all these chemicals could increase the uncertainty in the assessment, even though their overall health impact cannot be truly know. The section on TICs needs some balanced discussion.

Section 5.3.3 Exposure and Behavioral Patterns:

* Assumptions: EPA does not agree with the statements in this section. EPA does not believe that the mixing ratio of surface and subsurface soils can be know, especially over time, and recommends the use of clearly labeled bounding estimates.

EPA does not believe that protective equipment will always be used by excavation workers. Future excavations workers, and especially future construction workers, are more likely not to wear such equipment. Even when protective clothing is worn, it is often removed during smoking breaks or lunch. Contaminated clothing can be worn more than once and present a continuing source of exposure.

Onsite groundwater was available until recently, and was probably used in the past. It could be used again in the future the demand for water cannot be met. Onsite groundwater could be used for non-potable purposes, such as showering or it could be used in some site facility, such as a car wash. The Site assessment should seek to identify whether exposures could result in risk, and support the need for restrictions against the installation of on-site wells.

Section 5.3.4 Uncertainty/Dermal Soil Loading:

* Underestimations: EPA notes that the discussion does not include that Kissel's grounds keepers wore gloves, that the different work populations were evaluated after very short exposure periods in some cases, that the data sets were extremely small (2 workers in some cases), that no distributions or statistical percentile data can be applied to these data, that the Exposure Factors Handbook indicates the confidence in this data is low, that Kissel suggests that much of the data is not appropriate for use in this manner, and so on. Instead, ENVIRON insists that this data provides overestimates of the dermal pathways. EPA insists that some balance be added to these discussions.

Section 5.3.7 Uncertainty/Chromium:

* Underestimations: Only total chromium was analyzed for at the Site; no speciation analyses

were conducted. So the discussion that the chromium detected at the Site is pure conjecture, is not supported by real data, and there is no basis to believe that EPA's 6:1 ratio would be conservative. EPA notes that this was been a recycling plant site for a long period of time, and anything may have been included in the materials received. The construction scenario, which is missing from the assessment, would provide better bounding results than those stated.

Section 5.3.9 Uncertainty/Cumulative Risks:

* Underestimates: The cumulative risk assumes no synergistic or antagonistic interactions. However, it is more reasonable to assume that some synergistic effects, due to mixtures of contaminants, will occur, given the wide range of chemicals at the site. It is more likely that the effects of the interactions of mixtures will result in serious underestimates of risk at this site, than that the risk of these mixtures has been overestimated.

The text discusses the overestimation due to the inclusion of class C carcinogens, but the contribution to the risk estimates by these contaminants is not stated. It is more likely that the inclusion of class C carcinogens has had little effect on the risk estimates. Data should be provided to support this discussion.

Table 3-1

This Table has been modified since the last presentation (August 22, 1997). Many pathways have been eliminated or reduced to a semi-qualitative evaluation. The reason for the changes is not given.

Tables 3 -5 and 3-6:

* General: The tables do not specify what values apply to the current land use (restricted activities) or when they apply to the future land use (unrestricted activities). Both land uses are to be evaluated..

The construction scenario is missing.

The parameter intake values are inconsistent with EPA guidance, Region 5 guidance or simply in error in may cases (above discussions). They need to be revised.

Averaging times for non-carcinogens are most often incorrect.

Table 4-1 Toxicity Values:

* Incorrect Values:

The oral RfD for 1,1,1-Trichhloroethane should be 2.0E-02 instead of 3.5E-02.

The oral RfD for Copper should be 3.5E+00 instead of 4.0E-02.

Tables 5-1a, 5-1b, 5-2a, 5-2b:

* General: Most of above comments apply. In addition, many estimates are marked NA or

are listed as zero.

The future construction worker scenarios are missing.

Area 5A and %B appears to have been evaluated as one area.

Risks from future ingestion, dermal contact and inhalation of site water indoors are missing.